# SpeedDome® Ultra Vandal-Resistant Outdoor Housing

RHODUL-03VR (Clear Bubble)
RHODUL-04VR (Smoked Bubble)

Installation and Service Guide

Note: This housing meets IP66/Nema 4 ratings provided it is used with ROENDC Adapter Pipe and one of the following mounts: RHOTR Over-the Roof Mount, RHOSW Short Wall Mount, or RHOLW Long Wall Mount.

Cable Connectors

Housing Assembly
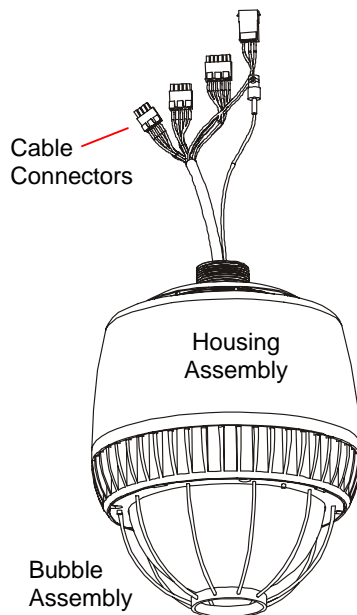
Bubble Assembly

Parts Supplied

- Housing assembly 0101-0061-02
- Bubble assembly 0404-0083-01/-02
- Tamperproof drive 1400-0149-01
- Install kit 0351-2183-05

Purchase or Supply Separately

- Male BNC connector

Tools Required

- 6.6mm (1/4in) fixed-handle nut driver for Torx bit
- Wire cutters and strippers
- 2.5mm (0.1in) slotted screwdriver

© Sensormatic 2004

Contents

About this Guide

This guide assumes that the outdoor mounting structure to which the housing is attached is in place and that data and power cables have been pulled to the installation site. For how to install the outdoor mounting structure, see documents shipped with the structure.

About the Outdoor Housing

The vandal-resistant outdoor housing has an aluminum sunshield cover, a high impact bubble, and a stainless steel bubble cage that protect the SpeedDome Ultra camera dome. Tamperproof screws affix the bubble to the housing.

The housing is temperature controlled and weatherproof. A built-in thermostat and heater prevent ice from forming on the outside of the bubble.

An environmental version of the SpeedDome Ultra I/O board is used. Simply connect video, power, and data, to the cable connectors and twist and lock the dome in place. Diagnostic power and communications LEDs ensure proper connection and aid in troubleshooting.

Four alarm inputs and two relay outputs (one normally open and one normally closed) are provided. Surge protection is provided on all external lines, including video.

Warnings and Cautions

Please review the following warnings and cautions before you begin installation or service.

Warnings

⚠ **WARNING!** Always use proper lift and safety equipment for the location and type of installation. Use the safety features of the lift equipment.

⚠ When connecting wires, ensure electrical power is not connected to the camera dome. The dome will move when power is applied. Also, ensure electrical power is not connected to nearby fixtures that you might touch during installation.

⚠ **WARNING!** The camera dome runs on 24Vac. DO NOT connect line voltage to the dome.

North America power requirements: In North America, this device is intended to be supplied from a Class 2 power supply. For outdoor installations, use Class 3 wiring techniques, liquid-tight conduit, or liquid-tight pipe.

This installation should be made by a qualified service person and should conform to all local codes.

⚠ **WARNING!** DO NOT install this housing where combustible or explosive products are stored or used.

⚠ **WARNING!** EU power requirements: This product runs on 24Vac. In the EU, it is intended to be powered from a Limited Power Source. A limited power source is a certified source of SELV, and if inher-ently limited, with 8 amps maximum output current, and a maximum of 100VA available; or if not inherently limited, fused with a maximum value of 3.3 Amps, meeting section 2.11 of IEC950, and a maximum of 250VA available. The power supply can be obtained through Sensormatic or through another source where the provider can furnish the verification. This is required to assure electrical safety in the product.

Stromanforderungen in der EU: Dieses Produkt wird mit 24 V Wechselstrom betrieben. In der EU ist es für den Betrieb durch eine begrenzte Stromquelle vorgesehen. Eine begrenzte Stromquelle ist eine zertifizierte SELV-Quelle (Schutzkleinspannung), bei inhärenter Begrenzung mit einem maximalen Ausgangsstrom von 8 A und 100 VA maximaler Verfügbarkeit, bei nicht inhärenter Begrenzung mit einer maximalen Sicherung von 3,3 A gemäß Abschnitt 2.11 der IEC950 und 250 VA maximaler Verfügbarkeit. Das Netzteil kann über Sensormatic oder eine andere Quelle bezogen werden, wobei der Anbieter den Nachweis der Konformität bereitstellen sollte. Dies ist zur Gewährleistung der elektrischen Sicherheit des Produktes erforderlich.

Cautions

- The bubble assembly comes in a separate box. To protect the bubble assembly, leave it in its box until you are ready to install it.

- Do not run data/power cables adjacent to or in the same conduit as line voltage mains power.

- Network cable/device restrictions:
    - SensorNet requires 22AWG unshielded cable. Do not exceed 32 devices per cable run.
    - RS422 requires 22AWG shielded cable. Do not exceed 10 devices per cable run.
    - Manchester requires 18AWG shielded cable. Do not exceed 3 devices per cable run.

- Outdoor housing contains an environmental PC board. Touch the metal housing to discharge static electricity before touching the board.

- Use a 2.5mm (0.1in) slotted screwdriver to tighten PC board connectors. Using a blade too wide can damage connectors. Do not over tighten connectors.

- When connecting the camera dome to the outdoor housing:
    - Remove both slot covers to keep the camera from overheating
    - Keep cables within the housing away from the heater assembly
    - Check heater fan operation. Both fans must be on to prevent overheating.
    - If required, set communication line termination inside the housing (see "Unterminating the Housing").

Preventing Condensation

Condensation may be eliminated by following instructions within this guide and observing the following cautions.

![warning triangle] **CAUTION:** Even small leaks must be prevented as they can increase humidity inside the housing.

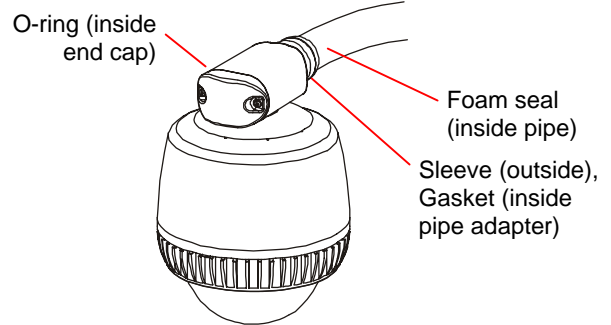DO NOT use over seals such as RTV and silicone caulks.

Ensure fans spin when power is on.

If possible, mount the housing so the least needed view (such as a wall, building corner, or pole) is opposite the fan/heater assembly.
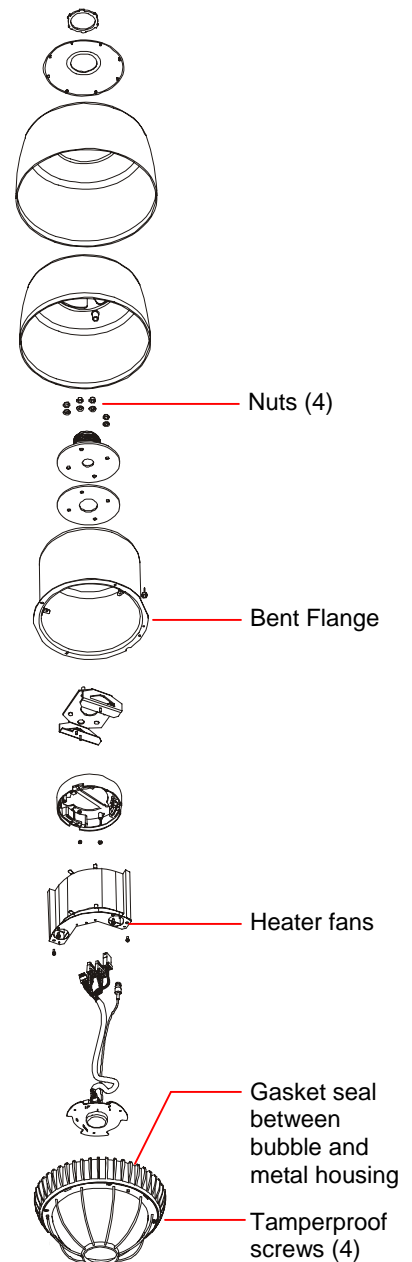
Problems that Can Cause Condensation

Damage, missing parts, or procedures that most often allow water to enter the housing are as follows (refer to figures opposite):

☐ Mounts that allow water to enter the air path. If an older horizontal mount is used, replace it with a new model or ensure there is ample slope away from the camera dome and a foam plug is present

☐ Missing foam seal from entry into the pipe of the mounting structure

☐ Missing O-ring on end cap, or missing sleeve or gasket on pipe adapter

☐ Missing Teflon tape around any housing pipe threads

☐ RTV or similar sealant covering an air path

☐ Loose nuts (4) at the top of the housing

☐ Heater fans not turning

☐ Bent flange on metal housing that compromises the gasket seal between the bubble and the housing

☐ Plugged drain holes in the bubble trim ring

☐ Cracked bubble

☐ Tamperproof screws that are missing or improperly tightened compromise the gasket seal between the bubble and the housing.

O-ring (inside end cap)

Foam seal (inside pipe)

Sleeve (outside), Gasket (inside pipe adapter)

Exploded view

Nuts (4)

Bent Flange

Heater fans

Gasket seal between bubble and metal housing

Tamperproof screws (4)

Procedure

Review the following procedure and prepare parts accordingly before installing the outdoor housing.

This procedure involves:

- Unterminating the housing, if necessary
- Attaching the housing to the mounting structure
- Attaching the camera dome to the housing
- Attaching the bubble assembly to the housing.

Unterminating the Housing

Both the housing and camera dome are shipped "terminated" for when the communication line stops at the camera dome. Should the line continue to another dome, set the housing to "unterminated". But always leave the camera dome set to "terminated" regardless of whether the line continues.

Note: If the comm. line stops at this dome, skip this procedure; otherwise, continue.

CAUTION: The environmental PC board inside the housing is static sensitive! Touch the metal housing to discharge it before touching the board.

1. As shown in below, detach the PC board from the housing by 1) pushing the fingers molded into the base away from the board while 2) pulling on the dust cover protecting the board's spring finger connector.

    CAUTION: To protect the connector, DO NOT remove the dust cover.
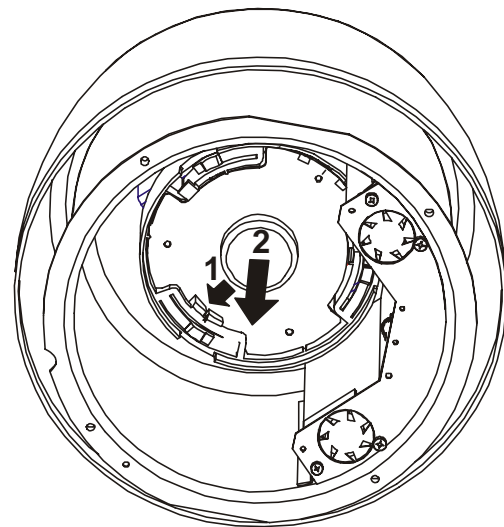
2. On the top side of the environmental PC board, place jumper E1 across pins 1–2 for "unterminated".
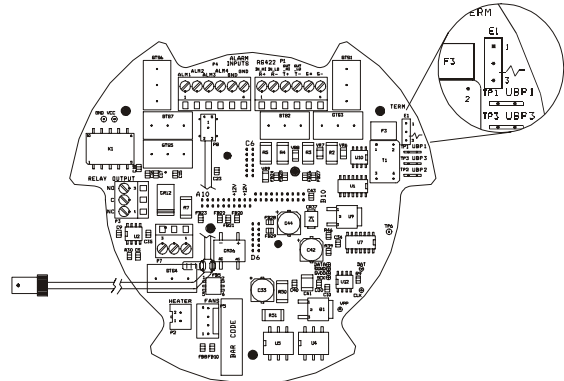
3. On the PC board is a mark. Reattach the board to the housing by centering the mark between fingers on the base and snapping the board in place.
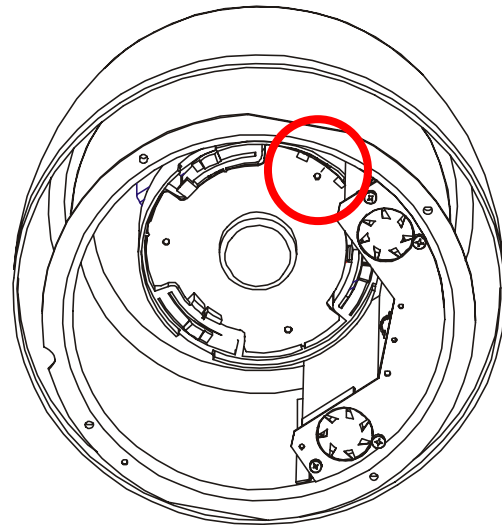
4. Gently remove the dust cover.

    Note: Keep the cover to protect contacts should the environmental PC board need to be removed from the housing.

Attaching the Housing to the Mounting Structure

⚠️ **WARNING!** Turn power off at the source before beginning this procedure.

If a "Street L" pipe or elbow is attached to the mounting structure, it does not mate with the housing. Instead, replace it with the ROENDC adapter pipe shown below.

⚠️ **WARNING!** Additional instructions for outdoor mounting are supplied with the mounting structure. To maintain the NEMA 4 IP66 rating, follow these instructions.

Adapter Pipe
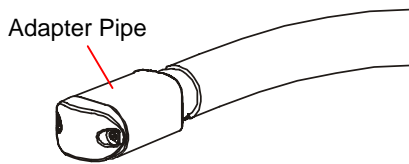
Parts Required

Install Kit 0351-2183-05

Connector, 3-Position, Power (green)	1	2109-0651-03
Connector, 4-Position, Alarm (blue)	1	2109-0804-04
Connector, 5-Position, Alarm (gray)	1	2109-0650-05
Connector, 6-Position, Data (black)	1	2109-0648-06

1. Connect video, power, data, and alarm cables from the J-box to the cable connectors exiting the housing.

   Note: See *Appendix A: Cable Requirements* for cable criteria.
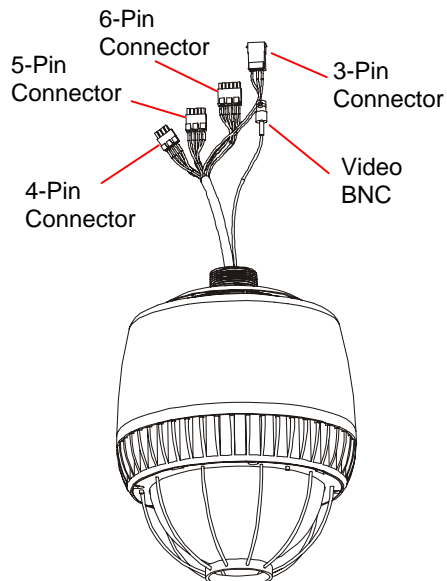
Video

Video connects to the BNC connector exiting the housing.

Power

Power connects to the green 3-pin connector.

Pin	Color	Description
1	N/A	24Vac
2	N/A	Common
3	N/A	24Vac

Data

Data connects to the black 6-pin connector (Manchester, RS422, or SensorNet).

Manchester

Pin	Color*	Designation
1-4	—	Not used.
5	Black	Manchester (+)
6	White	Manchester (−)

RS422

Pin	Color*	Designation
1	Orange	RS422 Data In High (+)
2	Green	RS422 Data In Low (−)
3	Yellow	RS422 Data Out High (+)
4	Brown	RS422 Data Out Low (−)
5-6	—	Not used.

SensorNet

Pin	Color*	Designation
1-4	—	Not used.
5	Brown	SensorNet (unshielded)
6	Yellow	SensorNet (unshielded)

*Color based on composite cable.

Alarm

Alarm wires connect to pins 4 and 5 of the gray 5-pin connector.

Pin	Color	Designation
4	N/A	Alarm Return
5	N/A	Alarm input (3.5mA sink)

Connect additional alarm inputs, if required, to the blue 4-pin connector.

Pin	Color	Designation
1	N/A	Alarm input (3.5mA sink)
2	N/A	Alarm input (3.5mA sink)
3	N/A	Alarm input (3.5mA sink)
4	N/A	Alarm Return

Relay Outputs

Connect relay outputs to pins 1, 2, and 3 of the gray 5-pin connector.

Pin	Color	Description
1	N/A	Normally Closed
2	N/A	Common
3	N/A	Normally Open (3.5mA sink)

2. Apply Teflon tape around housing pipe threads and attach the housing to the outdoor mounting structure. See instructions supplied with the structure.

3. Apply power to the housing.

4. On the environmental PC board shown below:

   a. Press and hold switch SW2 and observe green (ac power) and yellow (comm.) LEDs. The green LED glows steadily and the yellow LED glows steadily (for RS422) or blinks (for SensorNet).

   b. For RS422 data, press and hold data test switch SW1 and observe the nearby red and green LEDs for the following:

Constant green, Blinking red	RS422 line is correctly wired.
Constant green, No red	RS422 "Data In –" is shorted to ground.
Constant red, Blinking green	"Data In + /–" wires are reversed.
Blinking red, Green off	"Data In +" is shorted to ground.
Both LEDs off	"Data In +/–" wires are shorted or open.
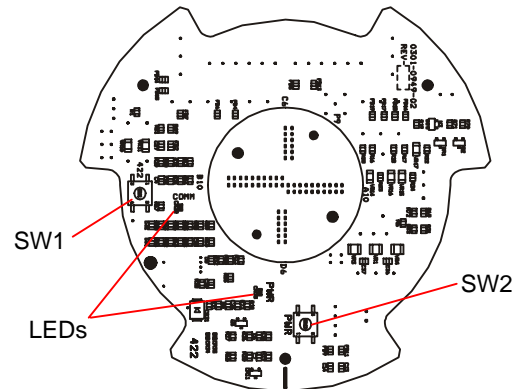
Attaching the Camera Dome to the Housing

This procedure involves:

- Removing BOTH slot covers from the camera dome
- Setting the camera address
- Checking the termination jumper on the camera
- Attaching the camera dome to the housing.

A. Remove BOTH slot covers

Note: Perform this procedure on the ground.

> ⚠️ **WARNING!** Proper ventilation requires slot covers be removed. Otherwise, the dome could overheat.

1. Slowly turn the eyeball to totally expose one of the two slot covers.

   CAUTION: Turning fast can damage motor gears.

2. Gently pry the slot cover loose by inserting a small slotted screwdriver between the slot cover and the assembly.

3. Slowly turn the eyeball to totally expose the remaining slot cover. Pry this cover off as well.

   CAUTION: With slot covers removed, avoid touching the camera lens.
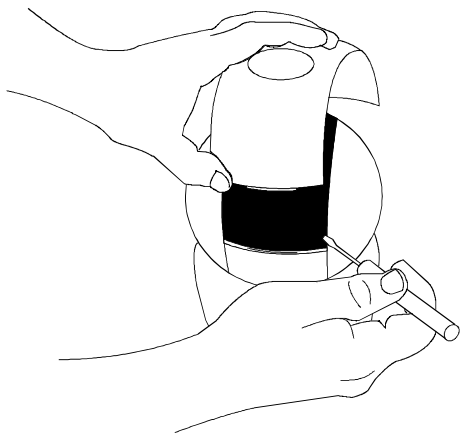
B. Set the camera address

At the top of the camera dome are three address switches. From left to right, set the switches to the address desired. For example: For address 166, set SW3 to 1, SW2 to 6, and SW1 to 6.

Protocol address ranges are as follows:

SensorNet	1–255
Manchester	1–64
RS422	1–99
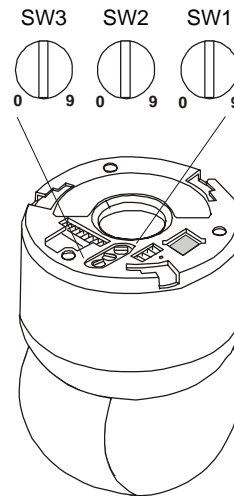
C. Check the termination jumper

Ensure the communication line termination jumper JW1 is set to "terminated" (pins 2-3). Pins 2-3 are farthest from 9-pin connector.

Note: A small slotted screwdriver may be used to pry the jumper loose. Be careful not to damage the underlying PC board.

D. Connect the dome to the housing

1. Align the protrusion at the top of the dome with the "white line" on the environmental PC board (or with the protrusion on the base).
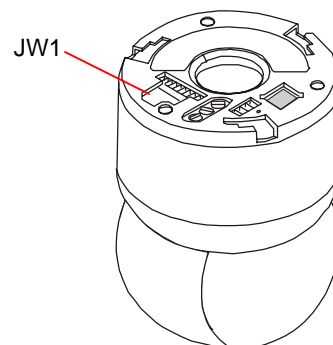
2. Mate the dome to the base and turn it clockwise until you hear a click.

> ⚠️ **WARNING! Heater fans must work!** If either or both fans are off, the dome could overheat.

Note: When power is connected to the camera dome, it performs the following homing routine.

a. After a few seconds, the heater fans turn on and the camera lens tilts up into the camera dome.

b. The lens tilts downs until it looks at the floor.

c. Eyeball pans slowly.

d. Lens tilts up 90° (home position). The controller can then be used to call up the camera and control it.

Align

White line on PC Board

Lock

LOCK
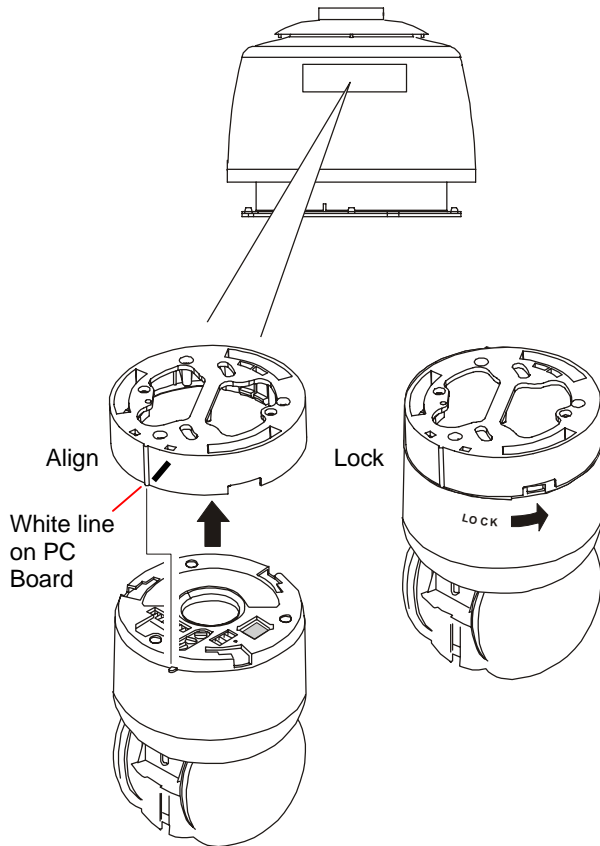
Attaching the Bubble Assembly to the Housing

1. Remove the bubble assembly from its box and ensure it is clean and free of debris.

2. Remove the "CAUTION: Remove slot covers" tag. Ensure slot covers are removed from the dome.

3. On the bubble assembly is a lanyard. Attach the lanyard to the threaded stud on the housing using the thumbnut.

4. Molded into the bubble assembly is a key. Align the key with the detent on the edge of the housing.

5. Secure the assembly to the housing using the four tamperproof screws. Use the drive (taped inside the bubble) to tighten the screws.

   CAUTION: Maintain the gasket seal between the housing and the bubble assembly by not letting the lanyard get caught between these two pieces as you secure the bubble to the housing.

Sun Shield

Stud

Detent

Lanyard

Key (molded into bubble assy.)
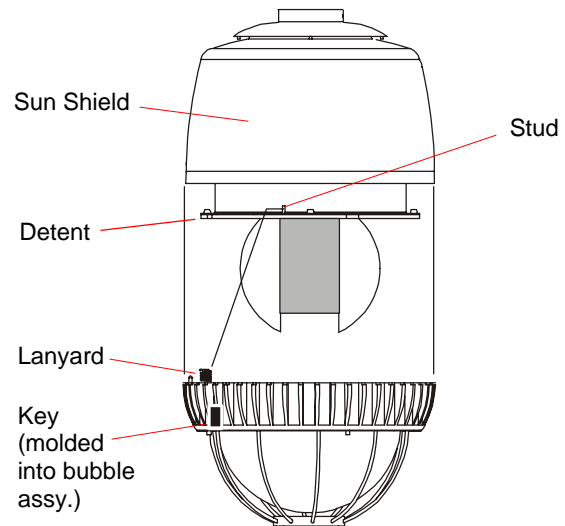
Note: If a problem arises, see *Appendix B: Troubleshooting*.

Parts List for Authorized Users

The following parts can only be ordered by authorized users. To become authorized, contact your sales representative.

1. Housing Assy., 0404-0084-01

2. Fan/Heater Assy., 0400-0935-01

3. I/O Board with Cable Assy., 0300-2484-02

4. Drive, Tamperproof, 1400-0149-01

5. Bubble Assy. (Clear), 0404-0083-01

6. Bubble Assy. (Smoke), 0404-0083-02
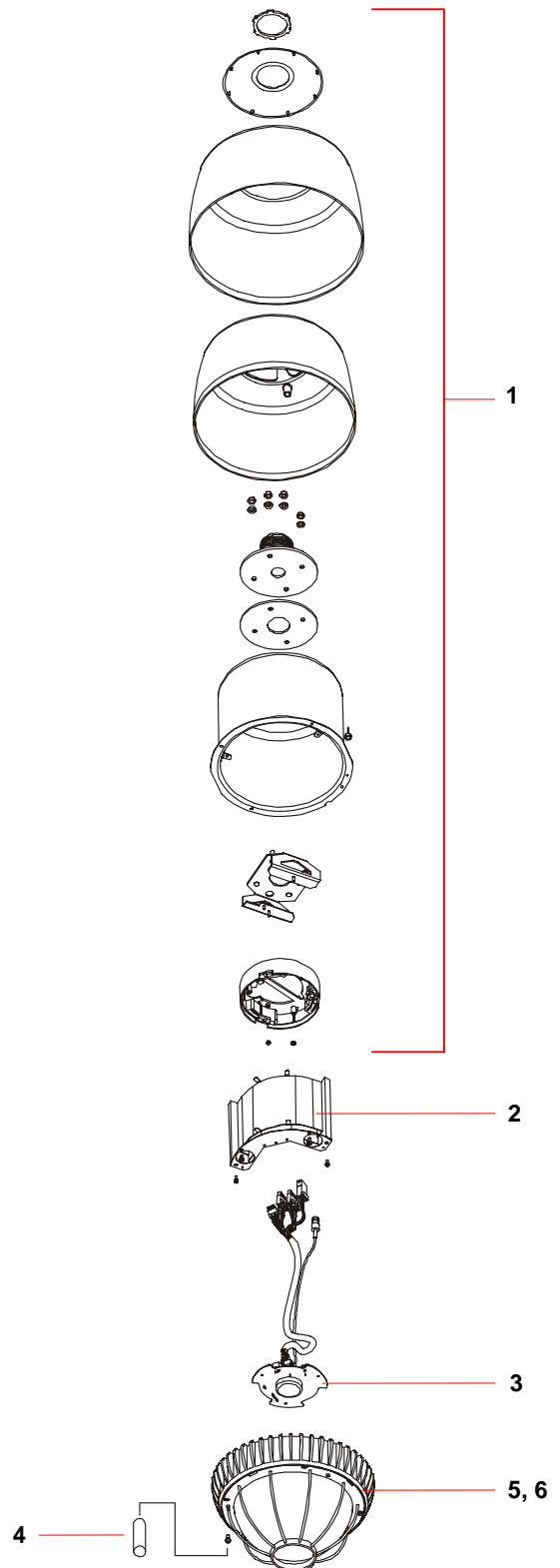
Specifications

Electrical
(combined dome and housing)

Input Voltage ....24 to 30Vac, 50/60 Hz
UL Listed Class 2
Certified Limited Power
Source

Design Tolerance..................20 to 36Vac, 50/60 Hz

Power Consumption ....80W max.

Power On In-Rush current 3A

Surge Protection:

Video ....Series resistor of 3.9 ohms;
low-capacitance Zener
suppressor of 6.5V,
1500W, 500W, 10kA
impulse-rated gas tube

Power Line............................TVS rated at 60V, 1.5
joules, 250A 8/20μs
impulse, 500W, 10kA
impulse-rated gas tube

RS422..................................Series resistor of 3.3 ohms;
TVS rated at 5.6V, 40A, 0.1
joules, 8/20μs impulse,
500W, 10kA impulse-rated
gas tube

Manchester/SensorNet ....Isolation transformer
coupled 2000Vrms; PTC
fuse protects transformer;
TVS rated at 5.6V, 40A, 0.1
joules, 8/20μs impulse,
500W, 10kA impulse-rated
gas tube

Alarm Input ....Series resistors of 33
ohms; TVS rated at 5.6V,
40A, 0.1 joules, 8/20μs
impulse, 500W, 10kA
impulse-rated gas tube

Auxiliary Output ....1000V Isolation Form 1-C
relay

Environmental

Operating Temperature.........–40°C to 50°C
(–40°F to 122°F)

Relative Humidity ....0 to 95% non-condensing

Storage Temperature ....–10°C to 50°C
(–14°F to 122°F)

Wind loading ....Sustained winds of
240Km/hour (150
miles/hour) when properly
installed and mounted
(wall, pole, ceiling, and
over-the-roof mount with
proper support)

Mechanical

Height...................................32.1cm (12.6in)

Diameter 24.4cm (9.6in)

Weight:
   Without dome ....2.7kg (6.1 lbs.)
   With dome ....3.9kg (8.7 lbs.)

Mechanical connection..........1.5in NPT

Declarations

Regulatory Compliance

Emissions .... 47 CFR, Part 15, Class A
ICES-003
EN55022 Class B
EN61000-3-2
EN61000-3-3
AS/NZS 3548, Class A
CISPR 22

Immunity EN50130-4

Safety UL1950
CSA C22.2 No. 950
EN60950
IEC 60950

FCC COMPLIANCE: This equipment complies with Part 15 of the FCC rules for intentional radiators and Class A digital devices when installed and used in accordance with the instruction manual. Following these rules provides reasonable protection against harmful interference from equipment operated in a commercial area. This equipment should not be installed in a residential area as it can radiate radio frequency energy that could interfere with radio communications, a situation the user would have to fix at their own expense.

EQUIPMENT MODIFICATION CAUTION: Equipment changes or modifications not expressly approved by Sensormatic Electronics Corporation, the party responsible for FCC compliance, could void the user's authority to operate the equipment and could create a hazardous condition.

Other Declarations

Thank you for using American Dynamics products. We support our products through an extensive and worldwide network of dealers. The dealer, through whom you originally purchased this product, is your point of contact if you have a need for service or support. Our dealers are fully empowered to provide the very best in customer service and support. Dealers should contact American Dynamics at (800) 507-6268 or (561) 912-6259 or on the web at www.americandynamics.net.

WARRANTY DISCLAIMER: Sensormatic Electronics Corporation makes no representation or warranty with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose.

NOTICE: The information in this manual was current when published. The manufacturer reserves the right to revise and improve its products. All specifications are therefore subject to change without notice.

LIMITED RIGHTS NOTICE: For units of the Department of Defense, all documentation and manuals were developed at private expense and no part of it was developed using Government Funds. The restrictions governing the use and disclosure of technical data marked with this legend are set forth in the definition of "limited rights" in paragraph (a) (15) of the clause of DFARS 252.227.7013. Unpublished - rights reserved under the Copyright Laws of the United States.

TRADEMARK NOTICE: *American Dynamics* and *Sensormatic* are trademarks or registered trademarks of Sensormatic Electronics Corporation. Other product names mentioned herein may be trademarks or registered trademarks of Sensormatic or other companies.

COPYRIGHT: Under copyright laws, the contents of this manual may not be copied, photocopied, reproduced, translated or reduced to any electronic medium or machine-readable form, in whole or in part, without prior written consent of Sensormatic Electronics.

MDR 1/04

www.americandynamics.net

Appendix A: Cable Requirements

Data Cable

The table below shows requirements for SensorNet, RS422, and Manchester networks. For more information about communication protocols and cable networks, see Communication Protocols and Cable Networks, 8000-2573-19.

Data cable requirements

	SensorNet	RS422	Manchester
Cable type	1 unshielded, twisted pair*	2 shielded, twisted pair*	1 shielded twisted pair**
Wire gauge	22 AWG	22 AWG	18 AWG
Connection	Non-polarized	Polarized	Polarized
Max. devices on line	32	10	3

* Power, data, and video cables can be ordered separately or within a composite cable that can be ordered in various lengths. Plenum-rated cables must be used in indoor ceilings used for environmental air return (called "other air space" in the National Electrical Code). Order parts through your distribution network.

Note: If you order cable from an outside source, wire colors may be different.

** Belden 88760 (plenum), or Belden 8760 cable (non-plenum) cable is recommended. Plenum-rated cables must be used in indoor ceilings used for environmental air return (called "other air space" in the National Electrical Code). Order cable directly from Belden by calling 1-800-235-3361.

Power Cable

The camera dome and housing are to be connected to a Class 2 LPS, 24Vac, 80VA power source. Do not exceed the maximum outdoor Class 2 ratings of 30Vac, 100VA.

	18AWG	16AWG	14AWG
Low Line Voltage 102/204 Vac	60m (200ft)	100m (320ft)	160m (520ft)
Low Line Voltage 90/180 Vac	30m (100ft)	50m (160ft)	80m (260ft)

Appendix B: Troubleshooting

This section covers what to do when:

- Dome does not respond to commands
- Fans do not turn
- Picture is grainy or discolored
- Poor video
- Ice forms on bubble.

Dome Does Not Respond to Commands

Follow steps until the problem is corrected. See page 9 to order parts.

1. Detach the camera dome from the base and check the address switches. Are they set correctly?
   - YES: Continue.
   - NO: Set the correct address and reconnect the dome.

2. Verify power is reaching the housing. Press and hold switch SW2 on the environmental PC board and observe the green (ac power) LED. Does the LED glow steadily?
   - YES: Reattach the dome and continue.
   - NO: Check power at the J-box and ac cable connections at connector P7 on the other side of the environmental PC board. If OK, replace the PC board.

   Connector P7 pin outs

Pin	Color	Description
1	N/A	24Vac
2	N/A	Common
3	N/A	24Vac

   CAUTION: Use a 2.5mm (0.1in) slotted screwdriver. Using a blade too wide can damage connectors.

   CAUTION: Screws on the ac connector are delicate. DO NOT over tighten them!

3. Verify data is reaching the housing. SENSORNET or RS422: Press and hold switch SW2 on the environmental PC board and observe the yellow (comm.) LED. The LED should blink (SensorNet) or glow steadily (RS422). For the location of SW2, see figure on page 6.

To verify RS422 connections at connector P1, press and hold data test switch SW1 on environmental PC board. For the location of SW1, see figure on page 6. Check the nearby red and green LEDs; they indicate the following:

Constant green, Blinking red	RS422 line is correctly wired.
Constant green, No red	RS422 "Data In –" is shorted to ground.
Constant red, Blinking green	"Data In + /–" wires are reversed.
Blinking red, Green off	"Data In +" is shorted to ground.
Both LEDs off	"Data In +/–" wires are shorted or open.

P1 pin outs:

Manchester data connections (Ultra IV only)

Pin	Color	Designation
1-4	—	Not used.
5	Black	Manchester (+)
6	White	Manchester (–)

RS422 Data connections

Pin	Color	Designation
1	Orange	RS422 Data In High (+)
2	Green	RS422 Data In Low (–)
3	Yellow	RS422 Data Out High (+)
4	Brown	RS422 Data Out Low (–)
5-6	—	Not used.

SensorNet Data Connections

Pin	Color	Designation
1-4	—	Not used.
5	Brown	SensorNet (unshielded)
6	Yellow	SensorNet (unshielded)

CAUTION: Use a 2.5mm (0.1in) slotted screwdriver. Using a blade too wide can damage connectors.

CAUTION: Screws on the connector P1 are delicate. DO NOT over tighten them!

4. Check fans. Are they on?
   - YES: Continue.
   - NO: Go to "Fans Do Not Turn" procedure on page 13.

5. Check video on monitor. Does the picture roll?
   - YES: Use the video controller or switcher to synchronize video vertical sync phases of all domes to the ac line. For specific instructions, see the installation and service manual for the controller or switcher.
   - NO: Continue.

   Is the picture normal?
   - YES: See "Detailed Troubleshooting" in the installation and service manual supplied with the dome.
   - NO: See "Poor or No Video" on page 14.

Fans Do Not Turn

Follow steps until the problem is corrected. See page 9 to order parts.

1. Determine if the camera dome is receiving power. Look for evidence such as a picture on the video monitor or dome movement.

2. Detach the dome to access the environmental PC board.

   Note: Power to fans comes from the dome. Fans will not function with the dome removed.

   CAUTION: Touch the metal housing before handling the environmental PC board.

3. Verify power is reaching the housing. Press and hold switch SW2 and observe the green (ac power) LED; it should glow steadily. If not, check power at the J-box and check that the ac cable is plugged into connector P7 on the top side of the environmental PC board.

   CAUTION: Use a 2.5mm (0.1in) slotted screwdriver. Using a blade too wide can damage connectors.

   CAUTION: Screws on the connector P1 are delicate. DO NOT over tighten them!

4. Check the fan connector. Is it plugged into connector P5 on other side of the environmental PC board?

   - YES: Replace fan/heater assembly 0400-0935-01. Remove two screws to remove assembly. Refer to item 2 in on page 9.

   - NO: Plug the connector in, reinstall the environmental PC board, and reconnect the dome. If fans still do not work, replace the fan/heater assembly.

Picture is Grainy or Discolored

Check the fans. If they are not turning, the camera dome may be overheating. See "Dome Does Not Respond to Commands" on page 12.

Poor or No Video

See "Dome Does Not Respond to Commands" on page 12.

Ice Forms On Bubble

Follow steps until the problem is corrected. See page 9 to order parts.

1. Are fans in the housing are working? If not, see "Fans Do Not Turn" on page 13.

2. Is the camera dome receiving power? Look for evidence such as a picture on the video monitor or dome movement.

3. Detach the dome to access the environmental PC board.

   Note: Power to the heater comes from the dome. The heater will not function with the dome removed.

   CAUTION: Touch the metal housing before handling the PC board.

4. Verify power is reaching the housing. Press and hold switch SW2 and observe the green (ac power) LED; it should glow steadily. If not, check power at the J-box and if the ac cable is plugged into connector P7 on other side of environmental PC board.

   CAUTION: Use a 2.5mm (0.1in) slotted screwdriver. Using a blade too wide can damage connectors.

   CAUTION: Screws on the ac connector are delicate. DO NOT over tighten them!

5. Check the heater connector on other side of the environmental PC board. Is it plugged into connector P2?

   - YES: Unplug the heater cable and check heater resistance across pins of plug. Is the resistance approximately 16 ohms?

     If yes, replace environmental PC board 0301-0949-01. If not, replace fan/heater assembly 0400-0935-01 by removing the two screws. Refer to item 2 in on page 9.

   - NO: Plug the connector in, reinstall the environmental PC board, and reattach the dome. If the fans still do not work, replace the fan/heater assembly.